

ABSTRACT OF THE DISCLOSURE

Aspects of the invention relate to methods and assemblies for improving the efficiency of a turbine engine through active management of blade tip clearances. In some designs, a portion of compressor exit air is routed to the rotor and discs of the turbine section. Aspects of the invention relate to treating the compressor exit air in light of the operating conditions of the engine. For instance, under base load or substantially steady state operation, a portion of compressor exit air can be routed to the rotor and discs without reducing the temperature of the compressor exit air. In such case, blade tip clearances will reduce, allowing for improved engine efficiency. Under part load or substantially transient operating conditions, a portion of compressor exit air can be cooled before it is supplied to the rotor and discs. As a result, the blade tip clearances increase, minimizing concerns of blade tip rubbing. Routing of the compressor exit air for cooling and bypass can be controlled by a valve.